IN THE CLAIMS:

Claims 1 to 34 (cancelled).

35. (currently amended) A gravity gradient measuring system for use in an aircraft comprising:

(a) a gravity gradiometer for mounting in an aircraft;

(b) a coarse stage isolation mount for mounting in an aircraft for attenuating ~~large~~ first displacements of the gradiometer relative to a flight path ideal to the measurement of gravity including:

(i) a platform ~~means~~;

(ii) translation stages supporting said platform ~~means~~ for movement along three orthogonal axes, whereby said translation stages isolate said platform ~~means~~ from low frequency, ~~large~~ first displacements of the aircraft along any of said three orthogonal axes in response to turbulence, thereby minimizing the acceleration of said platform relative to inertial space;

(iii) rail means supporting said translation stages ~~for~~ permitting movement of said platform along said three orthogonal axes;

(iv) drive means for moving said translation stages along said rail means; and

(v) first control means for determining the position of and controlling movement of said translation stages along said rail means; and

(c) a fine stage isolation mount carried by said platform means of the coarse stage isolation mount for supporting said gradiometer and adapted to attenuate second, high frequency~~, small~~ displacements of

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the gradiometer relative to an aircraft and consequently relative to a flight path ideal to the measurement of gravity gradients, said second displacements being smaller than said first displacements.

36. (previously presented) The gravity gradient measuring system of claim 35 wherein said coarse stage isolation mount includes:

a first frame for fixedly mounting the coarse stage isolation mount on a floor of an aircraft;

first rails mounted on said first frame for extending parallel to a floor of an aircraft and defining one of said orthogonal axes;

a second frame movably mounted on first rails for movement along said one of said orthogonal axes;

second rails mounted on said second frame for extending parallel to a floor of an aircraft and perpendicular to said first rails and defining a second of said orthogonal axes;

a third frame movably mounted on said second rails for movement along said second orthogonal axis; and

third rails mounted on said third frame extending vertically with respect to an aircraft floor and hence perpendicular to said first rails and said second rails and defining a third of said orthogonal axes, said third rails movably supporting said platform means for movement along said third orthogonal axis.

37. (currently amended) The system of claim 35, wherein said first control means determines and controls the position of said fine stage isolation mount

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relative to an aircraft ~~and consequently relative to a smoothed representation of a flight path of said aircraft~~.

38. (currently amended) The system of claim 37, including an aircraft, wherein said coarse stage isolation mount is mounted in said aircraft and wherein said aircraft includes a navigation system and a flight control system, said flight control system and said navigation system interacting to control a flight path of said aircraft, said flight control system operable by ~~at least one of~~ a human pilot ~~and~~ or an autopilot system.

39. (previously presented) The system of claim 38, wherein said fine stage isolation mount includes second control means for determining and controlling the position of said gravity gradiometer in the six degrees of freedom associated with motion of a rigid body.

40. (currently amended) The system of claim ~~38~~ 39, wherein said second control means of said fine stage isolation mount directs said ~~fine stage isolation mount~~ gravity gradiometer towards a home position measured relative to the aircraft, whereby ~~minimal~~ induced accelerations on the gravity gradiometer are ~~induced on the fine stage~~ minimized.

41. (currently amended) The system of claim 35, wherein said fine stage isolation mount includes:

a base mounted on said platform means of said coarse stage isolation mount;

a floater magnetically levitated relative to said base, said floater supporting said gravity gradiometer;

a plurality of accelerometers adapted to measure ~~said~~ accelerations of said floater; and

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a plurality of position sensors adapted to measure a relative position of said floater with respect to said base in the six degrees of freedom associated with motion of a rigid body.

42. (currently amended) The system of claim 41, wherein said accelerometers are ~~at least one of~~ linear accelerometers ~~and~~ or rotational accelerometers.

43. (currently amended) A method for obtaining fine resolution gravity gradient data comprising:

transporting a gravity gradiometer on a fine stage isolation mount carried by a platform of a coarse stage isolation mount in an aircraft experiencing low and high frequency accelerations and displacements from a flight path ideal to the measurement of gravity gradient;

isolating, in a coarse stage, the gradiometer from said low frequency accelerations and corresponding first displacements of the aircraft by sliding said platform and said fine stage isolation mount along three orthogonal axes relative to the aircraft in response to ~~large~~ such first displacements of the aircraft relative to said ideal flight path;

isolating, in a fine stage, the gradiometer from said high frequency accelerations and corresponding displacements by moving the gravity gradiometer on said fine stage isolation mount in response to ~~small~~ second, high frequency displacements of the coarse stage platform relative to the aircraft ~~and consequently relative to said ideal flight path~~ , said second displacements being smaller than said first displacements;

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tracking a position of said aircraft in the six degrees of freedom associated with motion of a rigid body;

during said isolating of the gravity gradiometer from said accelerations and displacements ~~in~~ by said coarse and fine stages, measuring gravity gradients using a gravity gradiometer; and

tabulating said gravity gradients as a function of said position of said aircraft.

44. (currently amended) The method of claim 43, wherein said tracking comprises:

identifying said position of said aircraft using ~~at least one of~~ an inertial navigation system ~~and~~ or a global positioning system.

45. (currently amended) The method of claim 44, wherein isolating of said accelerations and displacements in said coarse stage comprises:

measuring accelerations of said ~~fine~~ coarse stage,

measuring the position of said ~~fine~~ coarse stage relative to the aircraft; and

counteracting said accelerations and displacements measured through application of counteracting force to the coarse stage to move said platform and the fine stage isolation mount along one or more of said orthogonal axes.

46. (previously presented) The method of claim 45, wherein isolating said accelerations and displacements in said fine stage comprises:

measuring accelerations of a floater carrying said gravity gradiometer and magnetically levitated relative to a base of said fine stage using electromagnets;

measuring the position of said floater relative to said base; and

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compensating for said accelerations through variable application of current through said electromagnets.

47. (currently amended) The method of claim 44, wherein isolating of said accelerations and displacements in said fine stage includes:

determining said position of said floater relative to said ~~aircraft~~ base;

applying forces to said fine stage responsive to said position determined so as to reposition said floater towards a home position in, and relative to said ~~aircraft~~ base over a long time period, whereby minimum accelerations are induced on the ~~fine stage~~ gravity gradiometer carried by said floater.

48. (previously presented) The method of claim 43, wherein said coarse stage isolates the gradiometer from accelerations having frequencies up to 1 Hz, and said fine stage isolates the gradiometer from accelerations above 1 Hz.

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